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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/654,378	09/03/2003	Slawomir Rubinsztain	135371 (1306-40)	4182

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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NISKAYUNA, NY 12309

EXAMINER

FEELY, MICHAEL J

ART UNIT

PAPER NUMBER

1712

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/654,378

Applicant(s)

RUBINSZTAIN ET AL.

Examiner

Michael J. Feely

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40, 42 and 43 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0903, 0105, 0205.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-40, 42, and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by anticipated by Campbell et al. (Pub. No.: US 2004/0102529 A1).

The applied reference has a common assignee with the instant application; however, the inventive entity is different. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed

Art Unit: 1712

in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1-17, Campbell et al. disclose: *(1)* a transparent underfill composition (paragraphs 0002-0003, 0012, and 0048) comprising a curable resin (paragraphs 0012-0016) in combination with a solvent (paragraph 0043) and a filler of colloidal silica that is functionalized with at least one organoalkoxysilane (paragraphs 0025-0031);

(2) wherein the resin is selected from the group consisting of *see claim for list* (paragraphs 0012-0016);

(3) wherein the resin is selected from the group consisting of aliphatic epoxy resins, cycloaliphatic epoxy resins, and silicone-epoxy resins (paragraphs 0014-0016);

(4) wherein the resin is an aromatic epoxy resin (paragraph 0016); *(5)* wherein the aromatic epoxy resin is a cresol-novolak resin (paragraph 0016);

(6) wherein the composition further comprise a resin hardener (paragraph 0033);

(7) wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxypropanol acetate and methanol (paragraph 0043);

(8) wherein the colloidal silica is functionalized with phenyl trimethoxysilane (paragraph 0027); *(9)* wherein the colloidal silica is endcapped by a silylating agent (paragraph 0031); *(10)* wherein the silylating agent is hexamethyldisilazane (paragraph 0031);

(11) wherein the filler of colloidal silica further comprises silicon dioxide in an amount ranging from about 15 wt% to about 75 wt% of the composition (paragraph 0025); *(12)* wherein the colloidal silica has a particle size ranging from about 5 nm to about 100 nm (paragraph 0025); *(13)* wherein the colloidal silica is uniformly distributed throughout the resin (paragraphs

Art Unit: 1712

0046-0047); (14) wherein the colloidal silica is stable at room temperature (paragraphs 0029-0031);

(15) wherein the composition further comprises a catalyst selected from the group consisting of triphenyl phosphine, N-methylimidazole, and butyl tin dilaurate (paragraph 0033);

(16) wherein the composition further comprises additives selected from the group consisting of flame retardants, adhesion promoters, reactive organic diluents, curing agents and combinations thereof (paragraphs 0043-0045); and (17) wherein the reactive organic diluent comprises a monofunctional epoxy (paragraph 0043).

Regarding claims 18-23, Campbell et al. disclose: (18) a transparent underfill composition (paragraphs 0002-0003, 0012, and 0048) comprising an epoxy resin (paragraphs 0012-0016) in combination with a solvent (paragraph 0043) and a functionalized colloidal silica dispersion (paragraphs 0025-0031) wherein the functionalized colloidal silica further comprises silicon oxide in the range of about 15 wt% to about 75 wt% of the functionalized colloidal silica dispersion (paragraph 0025);

(19) wherein the epoxy resin is a cresol-novolak resin (paragraph 0016); (20) wherein the composition further comprises a novolac hardener (paragraphs 0033-0041);

(21) wherein the solvent is 1-methoxy-2-propanol (paragraph 0043; Examples);

(22) wherein the functionalized colloidal silica has a particle size ranging from about 5 nm to about 50 nm (paragraph 0025); and

(23) wherein the composition further comprises a catalyst selected from the group consisting of triphenyl phosphine, N-methylimidazole, and butyl tin dilaurate (paragraph 0033).

Regarding claims 24-27, Campbell et al. disclose: **(24)** a solid state device (paragraph 0048) comprising: a chip, a substrate, and a transparent underfill composition between the chip and the substrate (paragraph 0048) comprising an aromatic epoxy resin (paragraphs 0012-0016) in combination with a solvent (paragraph 0043) and a functionalized colloidal silica dispersion that is functionalized with at least one organoalkoxysilane (paragraphs 0025-0031);

(25) wherein the colloidal silica has a particle size ranging from about 5 nm to about 50 nm (paragraph 0025);

(26) wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxypropanol acetate and methanol (paragraph 0043); and

(27) wherein the composition further comprises additives selected from the group consisting of flame retardants, adhesion promoters, reactive organic diluents, curing agents and combinations thereof (paragraphs 0043-0045).

Regarding claims 28-35, Campbell et al. disclose: **(28)** a transparent composition of matter (paragraphs 0002-0003, 0012, and 0048) comprising a curable resin (paragraphs 0012-0016) in combination with a solvent (paragraph 0043) and a filler of colloidal silica that is functionalized with at least one organoalkoxysilane (paragraphs 0025-0031);

(29) wherein the resin is selected from the group consisting of aliphatic epoxy resins, cycloaliphatic epoxy resins, and silicone-epoxy resins (paragraphs 0014-0016);

(30) wherein the resin is an aromatic epoxy resin (paragraph 0016);

Art Unit: 1712

(31) wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxypropanol acetate and methanol (paragraph 0043);

(32) wherein the colloidal silica is functionalized with phenyl trimethoxysilane (paragraph 0027); (33) wherein the colloidal silica is endcapped by a silylating agent (paragraph 0031); (34) wherein the silylating agent is hexamethyldisilazane (paragraph 0031);

(35) where the composition is a transparent b-stage resin (paragraphs 0048-0049).

Regarding claims 36-40, 42, and 43, Campbell et al. disclose: (36) a method of producing a transparent underfill composition (paragraphs 0002-0003, 0012, and 0048) comprising: (a) functionalizing colloidal silica such that a stable concentrated dispersion of colloidal silica is formed (paragraphs 0025-0031); forming a concentrated dispersion of functionalized colloidal silica containing about 15 wt% to about 75 wt% silica (paragraph 0025); blending solutions of epoxy monomers with the functionalized colloidal silica dispersion (paragraphs 0012-0016); removing the solvent to form a hard, transparent B-stage resin film (paragraphs 0049 and 0071); and curing the B-stage resin film to form a low CTE, high T_g thermoset resin (paragraphs 0049 and 0071);

(37) wherein the step of functionalizing colloidal silica comprises functionalizing colloidal silica with phenyl trimethoxysilane (paragraph 0027);

(38) wherein the step of forming the concentrated dispersion of functionalized silica comprises placing the functionalized colloidal silica at a temperature ranging from about 20°C to about 140°C under a vacuum ranging from about 0.5 Torr to about 250 Torr (paragraph 0029);

Art Unit: 1712

(39) wherein the step of blending solutions of epoxy monomers with the functionalized colloidal dispersion further comprises adding to the solution an additive selected from the group consisting of flame retardants, adhesion promoters, reactive organic diluents, curing agents and combinations thereof (paragraphs 0043-0045);

(40) wherein the step of blending solutions of epoxy monomers with the functionalized colloidal dispersion further comprises placing the epoxy monomers in a solvent selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxypropanol acetate and methanol (paragraph 0043);

(42) a transparent B-stage resin film made by the process of claim 36 (paragraphs 0048-0049 and 0071-0072); and

(43) a low CTE, high Tg thermoset resin made by the process of claim 36 (paragraphs 0048-0049 and 0071-0072).

Allowable Subject Matter

3. Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

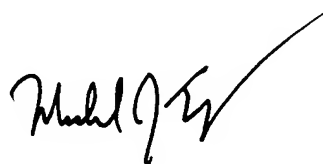
Art Unit: 1712

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely
Primary Examiner
Art Unit 1712

July 24, 2005